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CONTENTS

ORIGINAL PAPERS

The Sensitivity of Cornea and Conjunctiva of the Human Eye and the Use of Contact Lenses. *H. Strughold* 625

Congenital Bilateral Coloboma of Iris and Choroid—A Case Report. *Robert Greenberg* 631

An Investigation of Visual Performance Among Selected Groups of School Children. *Newell C. Kephart and Robert M. Unger* 635

The Electrical Responses of the Eye. Part IV. Some Sensory and Clinical Correlates. *David D. Michaels* 644

EDITORIALS

Seasons Greetings to You. *Carel C. Koch* 655

A Reply by the Guild. *Eugene Freeman* 656

SPECIAL REPORT

Third Party Interest in Visual Care. *William T. Cameron* 660

CORRESPONDENCE

Additional Comments on the Guild Reply. *Donald A. Springer* 669

CURRENT COMMENTS

Larger Deductions for Health Expenditures Proposed. *Terry Judith Parkins* 671

1953 ANNUAL INDEX 677-682

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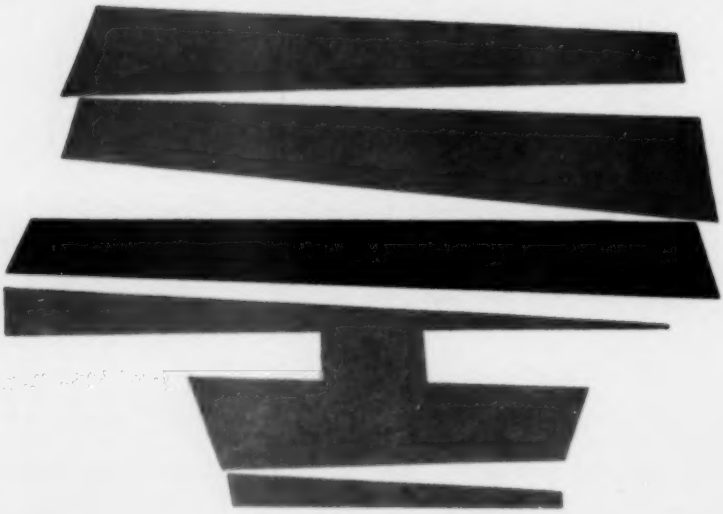

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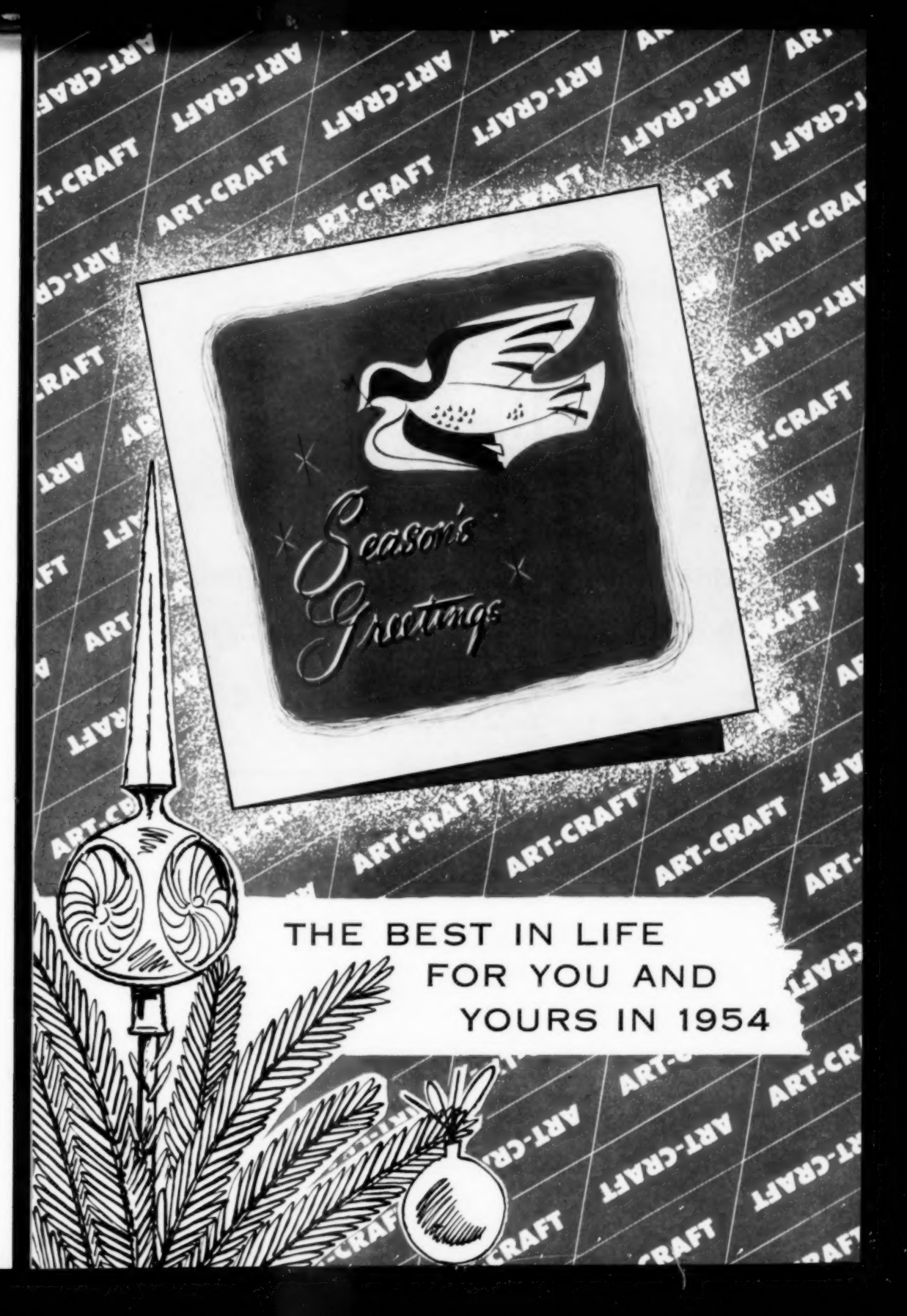
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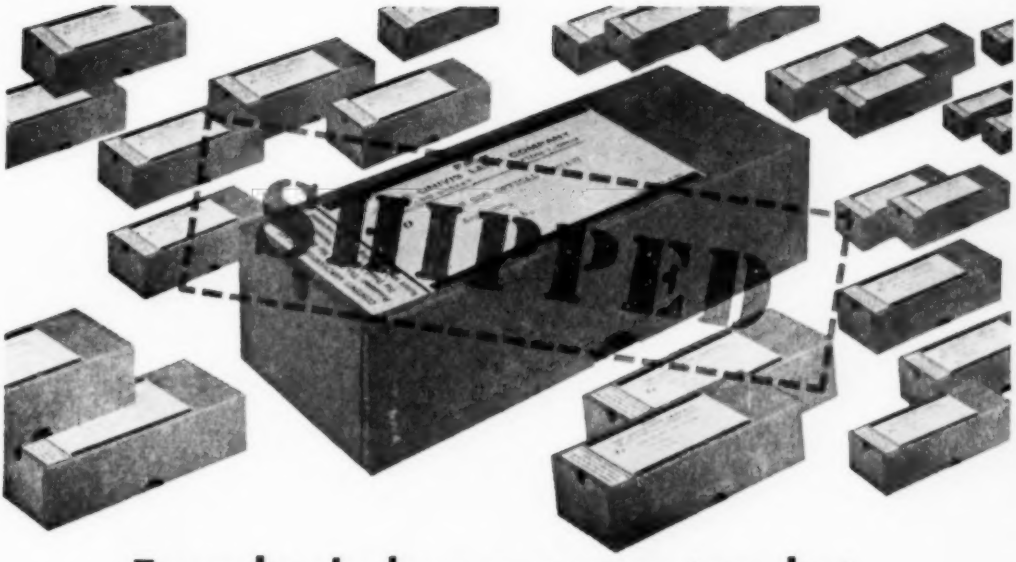

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Vol. 30 December, 1953 No. 12

THE SENSITIVITY OF CORNEA AND CONJUNCTIVA OF THE HUMAN EYE AND THE USE OF CONTACT LENSES*

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The invention of contact lenses represents definite progress in the correction of vision.[2, 13, 14, 22] However, these lenses cannot be considered as a perfect substitute for conventional glasses, since they produce discomfort after several hours. This is one of the reasons why the practicability of contact lenses for flyers has been questioned.[6, 8] This situation may be improved by considering more carefully the sensitivity of the eye when designing, constructing, and fitting contact lenses. In the following, therefore, a brief review is given of the sensitivity of the cornea and conjunctiva of the human eye, and in particular their response to mechanical stimuli.[7, 10, 23, 27, 28, 29]

In applying mechanical stimuli to the skin and mucous membranes, we differentiate generally between two kinds of sensations—touch or pressure sensation, and pain sensation. Since the latter is of greater importance for our discussion, we shall examine it first.

A. PAIN SENSATION DUE TO MECHANICAL STIMULI

The sensitivity of the cornea and conjunctiva to mechanical stimuli is best studied by means of fine hairs and white linen threads affixed to a rod and calibrated in gm./mm.^{2} pressure. Unlike the skin, the cornea and conjunctiva show only one type of sensation and, consequently, only one threshold in response to mechanical stimuli. This sensation has certain characteristics: it does not begin until after a latent period ranging from a fraction of a second to more than one second: it increases in intensity and abates and may increase again: it is poorly localized and felt as a disagreeable itching. It must therefore be classified as pain

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sensation, and a particular local shade in its quality can be observed.[9, 24] This sensation is commonly known as "foreign-body sensation."

It is interesting to note that the pain threshold varies considerably for the different regions of the eyeball. This is demonstrated in Figure 1. The diagram shows four meridians, 45 degrees apart, passing

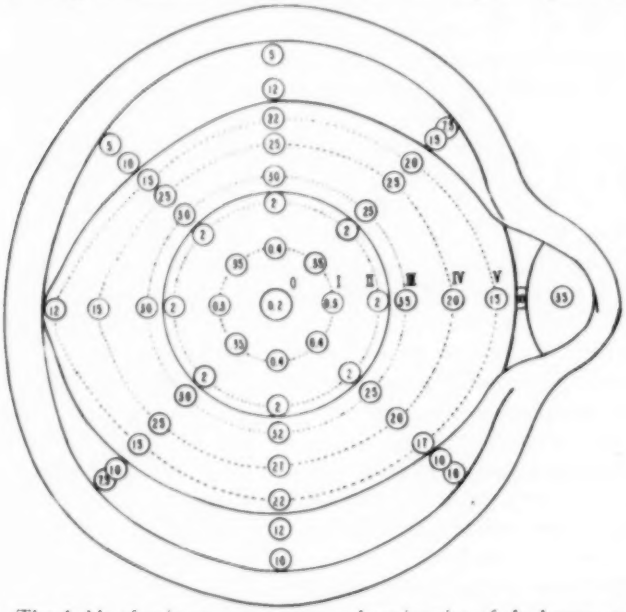

Fig. 1. Thresholds of pain sense on cornea and conjunctiva of the human eye. The numbers indicate the pressure values of the stimuli in gm./mm.^{2} (After M. von Frey and H. Strughold.)

through the center of the cornea and extending to the palpebral margin. These meridians may be designated as horizontal, vertical, frontal (i.e., directed toward the center of the forehead), and alar (i.e., directed toward the alae nasi). Each can be divided into an upper, a lower, a nasal, and temporal half. Along each meridian a series of points, indicated by circles, were chosen at which the excitation thresholds were to be determined. The thresholds measured in gm./mm.^{2} have been entered in the circles. In addition to lying along meridians, the excitation points form zones, approximately concentric around the center of the cornea and indicated by broken lines. The zero zone represents the center of the cornea. Zone I lies halfway between the center and margin of the cornea; zone II, on the margin of the cornea;

zone III, on the conjunctiva next to the margin of the cornea; zone IV, halfway between zone III and the fornix; zone V, adjacent to the fornix; zone VI, on the conjunctiva orbitalis near the fornix; and zone VII, on the tarsal conjunctiva. The thresholds were determined for a total of 55 points including the plica semilunaris and caruncula lacrimalis. The values were obtained for the author's left eye. Control tests performed on the left eyes of other subjects agreed with the values given in this diagram.

The illustration shows that the lowest threshold is obtained in the center of the cornea (0.2 gm./mm.^{2}). Toward the margin it rises to 2 gm./mm.^{2} This is in close agreement with Marx's investigations on the cornea.[17] After transition to the conjunctiva there is a sudden increase of the threshold up to about 30 gm./mm.^{2} in zone III; then the thresholds fall to about 15 gm./mm.^{2} near the palpebral margin.

In Table I the third column gives the mean thresholds (expressed in gm./mm.^{2}) for the various zones of the cornea and cunjunctiva bulbi; the fourth and fifth columns show the relative values. The threshold and sensitivity of the corneal center are given the value of 1.

Zone III is of special interest with regard to the use of contact lenses. Its threshold is almost 150 times as great as the threshold in the center of the cornea and corresponds approximately to the pain sensibility of the skin of the lower arm.

In contrast to the enormous differences along one meridian, the differences within a zone are negligible.

The thresholds of points on the horizontal diameter are only slightly below those for the vertical diameter.

Figure 2 (left) presents a diagram of the pain sensitivity of the entire ocular surface, disregarding quantitative values. The denser the dots become, the greater is the sensitivity.

Comparative studies on the rabbit's eye yielded similar differences in the various zones of cornea and conjunctiva.[26] On the whole, however, the thresholds are higher.

TABLE 1

	Zone	*Mean threshold gm./mm.^{2}*	*Relative values Of threshold*	*Of sensitivity*
	0	0.2	1.0	1.000
Cornea	I	0.36	1.8	0.556
	II	2.0	10.0	0.100
	III	29.7	148.5	0.008
Conjunctiva bulbi	IV	22.8	114.0	0.009
	V	17.5	87.5	0.011

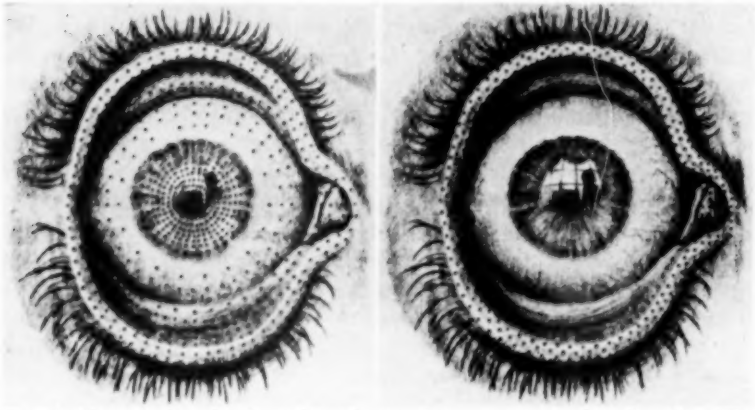

Fig. 2. Topography of pain and touch sensation on cornea and conjunctiva. The denser the spots the greater the sensitivity. Left figure, pain sensation. Right figure, touch sensation.

In summary, the following may be said:

1. Responding to mechanical stimuli, the eye shows only one type of sensation, namely, that of pain.

2. The pain sensitivity of the cornea and conjunctiva varies greatly with the region. It is highest in the center of the cornea and lowest in the limbal part of the conjunctiva. The center of the cornea has the lowest pain threshold of all body regions.

B. PRESSURE SENSATION

In response to mechanical stimuli, the palpebral margin and the marginal area of the conjunctiva tarsalis show a second type of sensation which occurs prior to the pain sensation. It appears without a noticeable latent period, disappears immediately after the stimulating hair is removed, and recurs as soon as the hair is reapplied. It is felt as a tickle when the hair glides over the surface, and it is sharply localized. A sensation with such characteristics is termed a touch or pressure sensation. Its topographical distribution on the eye is demonstrated in Figure 2 (right). This illustration shows that the pressure sense does not exist on the cornea and conjunctiva, except on the conjunctiva tarsalis, the palpebral margin, and the caruncula lacrimalis. The thresholds, likewise tested with hairs, correspond approximately to those of the pressure sense on the skin of the lower arm, being slightly higher than the thresholds on the outer skin of the eyelid.

The sensations produced by mechanical stimuli applied to the anesthetized cornea and conjunctiva cannot be designated as pressure

sensations, but rather as a variety of pain, showing the previously mentioned characteristics of pain sensation. This conclusion was drawn as a result of investigations by von Frey and Webels,[10] and von Frey and Strughold.[11]

It has been stated that with regard to mechanical stimulation, the eye has areas such as the cornea and conjunctiva bulbi, which are sensitive to pain and other areas such as the conjunctiva tarsalis and the palpebral margin, which are sensitive to pain and pressure.[11, 13, 23, 25] Dissenting opinions are found in references 12, 14, 15, 18, 21, 22 and 27. In this connection I would like to call attention to an observation which is interesting from the sensoriphysiological viewpoint. As is well known, the localization of pain sensation is considerably more difficult than that of pressure sensation. Wearers of contact lenses report that if a lens moves out of place they cannot tell in which direction it is displaced. This must be expected if the cornea and conjunctiva have only a pain sense and no pressure sense. Conversely, we may say that the poor ability to localize contact lenses also supports the opinion that pressure sense is absent in these regions.

As to the receptors, it is generally assumed, in agreement with von Frey's conclusions, that the free nerve endings are the receptors of pain sensation; Meissner's corpuscles and the nervous plexuses at the hair roots are assumed to be receptors of pressure sensation. The latter are found only at the cilia along the palpebral margin. Meissner's corpuscles have been demonstrated in the conjunctiva tarsalis. Free nerve endings exist in the conjunctiva bulbi and in an especially dense arrangement in the cornea. They are the only nerve elements found in the center of the cornea. Conditions are different in the marginal areas of the cornea and in the conjunctiva, where large numbers of Krause's endbulbs are distributed. These are assumed to be the receptors of cold sensation.[1, 3, 4, 5]

In the literature, widely dissenting opinions as to the sensitivity of the eye have been expressed. This paper is based upon the knowledge gained and experiences had by the author in his long association with the school of Max von Frey. For the convenience of the reader who wishes to inform himself about the various dissenting opinions on this subject, a complete bibliography has been included.

The author realizes that individual variations warrant the testing of a greater number of subjects; such investigations are hampered, however, by the extreme discomfort experienced by the subject during the experiment.

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STEDMANS MEDICAL DICTIONARY. 18th edition. Edited by N. B. Taylor and A. S. Taylor. Published by Williams & Wilkins, Baltimore, Md., 1561 pages. Illustrated. Cloth $11.50. 1953.

A LABORATORY MANUAL OF EXPERIMENTS IN PHYSICS. 6th edition. Leonard R. Ingersoll, Miles J. Martin and T. A. Rouse. Published by McGraw-Hill, New York City. 286 pages. Illustrated. Cloth $4. 1953.

MANUAL OF OCULAR PATHOLOGY FOR OPTOMETRISTS. 7th edition. George A. MacElree, O.D., F.A.A.O. Published by Press of the Pennsylvania State College of Optometry, 12th and Spencer, Philatelphia, Pa. 566 pages. Illustrated. Cloth $12. 1953.

MAY'S MANUAL OF DISEASES OF THE EYES. 21st edition. Edited by Charles A. Perera, M.D. Published by Williams & Wilkins, Baltimore, Md. 512 pages. Illustrated. Cloth. $6. 1953.

CONGENITAL BILATERAL COLOBOMA OF IRIS AND CHORIOID — A CASE REPORT*

Robert Greenberg†
Tallahassee, Florida

Patients with congenital malformation of the ocular apparatus for which surgical or optometric assistance is of little apparent value are fortunately not numerous. However, on occasion the optometrist has an opportunity to render visual aid to such handicapped persons. Recently a young man, aged 24, who had a coloboma of the iris and chorioid presented himself for examination with the expressed hope of being able to attain vision of sufficient acuity to warrant issuance of a driver's license. Since it was possible to help this patient, it was felt that the case history would be of interest to the profession.

I. CASE HISTORY

OCULAR: The patient had consulted many eye practitioners during his life and had been advised by all that it would be impossible to improve his vision by any means. He had spent the first 11 years of his life in the state school for the blind, learning Braille as a matter of course, although some reading instruction had been given. His senior year in high school had been spent in the sight conservation class of a regular school. Because his earning capacity would be markedly increased if he were able to drive a motor vehicle, he was willing to try anything that might improve his acuity. The only other person in the patient's family who has an ocular anomaly is a sister who has congenital unilateral ptosis.

HEALTH: The patient was born two months prematurely, his mother having had difficulty during pregnancy. As an infant he was so weak and sickly that the family physician held little hope for his survival during the first year of life. The patient had the usual childhood diseases with no complications. His general health has been in recent years and is at present good. No medical records were available to the author.

OCCUPATION: The patient is a piano tuner and critical acuity is not essential for this job.

SOCIAL: The patient's leisure activity is limited, particularly since

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†Optometrist.

his wife is essentially blind, having only light perception. He enjoys reading but the material must have large type and be held very close to the right eye. He also enjoys attending movies but misses most of the details.

COMPLAINT: The patient believes that he can increase his earning capacity if he can improve his vision enough to enable him to drive. He has almost given up hope of improving vision but will try anything that offers any chance of success. Although his main desire is to be able to drive, he would also be grateful for improved reading ability.

II. REPORT OF EXAMINATION

EXTERNAL: The patient has a congenital, bilateral coloboma of the iris (Figure 1) and also a conjugate, lateral, rotary nystagmus.

Fig. 1. Normal appearance of iris.

There is little or no pupillary reaction to light or convergence. The intraocular tension is normal, by palpation, as are the lids, conjunctivas, canthi and lacrimal apparatuses.

MOTILITY: There is a freedom of motion in all meridians. Rotations, versions and fixations are jerky and inaccurate as a result of the nystagmoid motion.

PERIMETRY: Confrontation fields using a dim retinoscope bulb as a target show a slight constriction of the nasal fields. Tangent screen studies show a temporal enlargement of the blind spot but the inability to fixate accurately makes only approximate measurements possible.

OPHTHALMOSCOPY: This was extremely difficult because of the constant motion of the eye, but it is apparent that there is an absence

of large areas of the chorioid. The fundus is seen as a white (scleral) area and only at an extreme angle are flashes of pink (normal retina) seen.

VISUAL ACUITY: The unaided visual acuity is 20/200, O.D., and O.U.; 20/400, O.S. At about six inches the patient has a visual acuity of 20/80-1, O.D., and 20/200, O.S., with a reduced Snellen nearpoint card.

KERATOMETRY: O.D. 41.50 @ 180.
43.50 @ 90.
O.S. 42.00 @ 180.
43.50 @ 90.

REFRACTION: It being impossible to perform the usual clinical tests, a trial and error procedure was followed, using a trial frame with pin hole discs and stenopaic slit. No measureable reflex could be obtained with the retinoscope and no improvement of visual acuity could be obtained.

III. ANALYSIS OF FINDING

Patient is almost entirely dependent upon the right eye for reading, working and distance seeing. The left eye is used only for peripheral viewing of gross objects. Obviously, if the visual acuity was to be improved at all, subnormal visual aids were indicated.

IV. CORRECTIVE PROCEDURE

Both Kollmorgen and Univis telescopic lenses were tried with about equal results. With a 2X telescopic lens, the visual acuity of the right eye was improved to slightly better than 20/80 and a +4.00 D. add made it possible to read magazine type at about 33 cm. It was decided to try a fluidless scleral contact lens with painted iris to reduce pupil size. The lens which was finally fitted on the right eye was an aspherical (to prevent rotation inasmuch as the patient's pupil was displaced nasally) Mueller-Welt lens with a painted iris presenting a pupillary diameter of 3 mm. This size pupil was the result of trial and error. There was no power in this lens and the lens alone did not measureably improve the vision, but the patient reported that everything seemed clearer and more sharply defined. This contact lens, however, in combination with a 2X Univis telescopic lens brings the distance acuity to 20/40 and a +4.00 D. add enables the patient to read comfortably at a normal reading distance.

V. SUMMARY

Since the final corrective measures were applied, the patient has returned several times to report on his progress. The goal of achieving

sufficient vision for driving will not, in all probability, be reached because of the restricted field of vision. However, the patient is now able to enjoy movies, television, reading and sports to an extent heretofore impossible.*

*I am pleased to acknowledge the able assistance rendered by Dr. A. Mueller-Welt of International Lens Laboratories who designed and fabricated the contact lens used

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FUND REPORT

SHEARD COMMEMORATIVE VOLUME

On November 16 the Optometric Committee working on the fund raising campaign for the Sheard Commemorative Volume reported receiving a group of 377 pledges for a total of $6,043.25. The above amount does not include the additional funds already raised by the committees in ophthalmology and opticianry for this project. This is a splendid showing and assures all *friends of Sheard* that the subscriptions will reach the minimum total of $8,000 set early in the summer.

Among the pledges were those from the following optometric organizations:

British Chapter, American Academy of Optometry, $57.75.
California Optometric Association, $35.00.
Central Ohio Chapter, American Academy of Optometry, $50.00.
Colorado Optometric Association, $25.00.
District of Columbia Optometric Association, $25.00.
Indiana Chapter, American Academy of Optometry, $25.00.
Indiana Optometric Association, $50.00.
Massachusetts Society of Optometrists, $25.00.
Minnesota Optometric Association, $25.00.
Nebraska Optometric Association, $25.00.
New Jersey Optometric Association, $25.00.
New York Academy of Optometry, $50.00.
North Carolina Chapter, American Academy of Optometry, $25.00.
Ohio State Optometric Association, $25.00.
South Dakota Optometric Association, $25.00.
Southern California Chapter, American Academy of Optometry, $25.00.
Washington Optometric Association, $25.00.

In addition a $25.00 pledge has been received from the M. B. Ketchum Memorial Library of the Los Angeles College of Optometry, and a $25.00 pledge from the OPTICAL JOURNAL AND REVIEW OF OPTOMETRY, New York City.

AN INVESTIGATION OF VISUAL PERFORMANCE AMONG SELECTED GROUPS OF SCHOOL CHILDREN*

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Several investigations dealing with visual changes in school children have been reported. However, the results and conclusions have been conflicting, thus making it apparent that further research is necessary in this field. One of the main controversies has been over the type of visual change occurring during the summer vacation period. A myopic trend during school experience has been recognized for some time. Whether a change toward a decrease in myopia occurs over the summer is still apparently a speculative matter as the reported evidence is inconclusive.

A study reported in 1939 by Luckiesh and Moss[5] dealt with such changes in fifth and sixth grade children. Though conclusive evidence was lacking, these authors felt their results indicated that "the refractive change occurring during the summer months is toward an increase in hyperopia, or opposite in direction to that occurring during the school year." In 1950 Kephart[3] reported results from retinoscopic examinations of children in grades two through eleven. It was his conclusion that a change in visual status occurs over the summer vacation and that this change is in the direction of recovery from the myopic tendency apparent over the school year. He also felt that this recovery becomes less effective as the grade level increases. Following this study Kephart and Mazzoni[4] reported the findings of a study which employed a non-clinical battery of tests to check the visual changes of children over the summer. It was their conclusion that significant changes in acuity occurred during the vacation, the direction of change being toward increased acuity. Hirsch[2] investigated the effects of the vacation period as measured by retinoscopic examinations. His results were in direct contrast to those of Kephart: the myopic trend evident during the school year was found not to reverse during the summer but rather to continue at the same or even a slightly increased rate.

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Due to these conflicting reports, particularly those of Kephart and Hirsch, the present study was designed to investigate further this same matter as well as other related aspects.

EXPERIMENTAL PROCEDURE

Subjects. In order to investigate the difference in visual performance between rural and urban school children and between children in different grade levels, subjects were chosen from several grades of two different schools. The schools selected were the Battle Ground, Indiana, grade school, and Morton grade school in West Lafayette, Inidana.* In the statistical analysis, ten children per grade from grades four through eight in each school were used. Although fifteen children per grade were given the initial test, some of them were not available for the final examinations. Complete data were available for ten children in the grade containing the lowest number of complete records. At all other grade levels a random selection was made so that ten subjects per grade or a total of one hundred subjects were used in this study.

It was felt that these two schools were representative of their respective types, rural and urban. West Lafayette is a residential community adjacent to its larger sister city, Lafayette, while Battle Ground is a small town several miles from Lafayette. To insure that a representative rural group of children was used, only those children in the rural community who actually lived on farms were selected for study. An optometrist performed two retinoscopic examinations for each child (one in September and one in May). To avoid the possible introduction of an uncontrolled variable (differences between examiners) the same optometrist performed all the observations. The two principal meridians (horizontal and vertical) in each eye were "scoped." Readings were recorded to the nearest quarter of a diopter. Thus, with two testing periods involving two readings per eye for one hundred subjects, a total of eight hundred scores were available for analysis.

Statistical Design. A convenient method of analysis for research which involves the evaluation of differences among several sets of data is the method of analysis of variance.[1] This was the technique employed to evaluate the data of this study. Every source of variation being investigated is considered in this technique, and the resulting measures of variation are analyzed for possible differences. Differences between single variables and among all interactions of the variables are thus

*The authors wish to express their appreciation to Mr. William Floyd, Superintendent of the West Lafayette Public Schools and Mr. R. S. Miller, Superintendent of the Battle Ground Public Schools for their cooperation in this study; also to Herbert Bonnet, O.D., for performing the retinoscopic examinations.

considered. The complete structure of analysis for this study involved forty sources of variation which are broken down into eight sets. The last set of this structure was not analyzed since it consisted of second, third, and fourth order interactions which would have been most difficult to interpret had any differences been found. Thus, the analysis actually used comprised seven sets and a total of thirty-four component sources of variation. An outline of this structure showing the variables and various interactions may be seen in Table 2.

RESULTS

Homogeneity of Variance Tests. Prior to any analysis concerning the experimental means, it seemed wise to test for homogeneity of variance. Tests were thus made for all seven sets of data broken down into "school by grade" cells for analysis. In this manner the hypothesis that the samples (the school by grade cells) are random samples from populations with a common variance was tested for all groups. If this hypothesis cannot be assumed for any group, then results in that group cannot be interpreted by existing methods.

The test for homogeneity of variance used was that of Bartlett as described by Edwards.[1] Results of these tests are shown in Table 1. The values of chi-square are indicated for all groups, but only those results that were statistically significant were "corrected." These corrected chi-squares will give more accurate values for interpretation. It was designated beforehand that the one per cent level of significance would be used for evaluation. Any chi-square falling beyond this level then necessitated the rejection of the hypothesis of a common variance.

As is seen in the table, the corrected X^2 of 18.107 for the first group, which involves variation among subjects, is statistically significant at the 5% level. However, this was not considered sufficient to warrant rejection of the hypothesis of a common variance. The corrected X^2 of 64.899 for the group which involves the variable "eyes" is significant well beyond the 1% level. Thus, the assumption of homogeneity of variance is untenable, and any further results in this group must be considered with due reservation. All other groups can be assumed to satisfy the homogeneity of variance condition.

Statistical Presentation. The analysis of variance, as previously described, was carried out. The end result of these calculations was a series of F-tests, the magnitudes of which indicate any statistical differences between the variables and their interactions. This analysis is shown in Table 2. All results statistically significant at the 5%

and 1% levels have been indicated. The results of the group which did not satisfy the homogeneity of variance condition are also indicated but no evaluation of them is made.

Two differences between single variables were statistically significant at the 1% level. These differences were between rural and urban schools and between spring and fall testings. Two first order interactions, meridians by schools and eyes by meridians, were also found to be significant at the 1% level. A second order interaction, testing by eyes by grades, and a third order interaction, testing by meridians by schools by grades, were significant at the 5% level.

Discussion. In order to interpret these results, the means corresponding to the significant F-tests were analyzed. The appropriate means (excepting those for the third order interaction) are presented in Table 3. It might be noted here that positive retinoscopy scores indicate a hyperopic condition and that negative scores indicate a myopic condition: zero scores correspond to an emmetropic state.

Differences between single variables are interpreted the most directly. The significant difference between the schools indicates there is a difference in the visual status between rural and urban school children. An examination of the means reveals that the Battle Ground children are nearly emmetropic, while the West Lafayette children are more myopic. This finding may be hypothesized when the relative amounts of indoor and outdoor activities of city and farm children are considered. The farm children have definite outside chores to perform, while the city children probably spend a greater proportion of their time inside at closer visual tasks.

TABLE 1
HOMOGENEITY OF VARIANCE TESTS

Group	X^2	*Corrected* X^2
Subj. within S x G cells	18.845	18.107*
T x subj. within S x G cells	8.503	
E x subj. within S x G cells	67.543	64.899**
M x subj. within S x G cells	13.376	
T x E x subj. within S x G cells	9.126	
T x M x subj. within S x G cells	16.530	
E x M x subj. within S x G cells	11.521	

*Significant at the 5% level.
**Significant at the 1% level.
Code:
Subj.: subjects
S: schools
G: grades
T: testings (spring—fall)
M: meridians (horizontal—vertical)
E: eyes (right—left)

The difference found between testings indicates that a change in visual status does occur during the summer vacation period. An examination of the means reveals that the fall testing shows a lesser degree of myopia than the spring testing. This finding is firmly supported by the magnitude of the F-ratio (46.17). Thus, the earlier conclusion by Kephart, that a recovery from the myopic trend occurs during the vacation period, is upheld.

To interpret the first order interactions, two variables must be considered simultaneously; the two variables working together produce different results than either one alone. The interaction, meridians by schools, indicates that the difference between meridian measurements is

TABLE 2
ANALYSIS OF VARIANCE OF RETINOSCOPY SCORES

Source of Variation†	*df*	*SS*	*MS*	*F*
Between schools	1	71.700	71.700	7.92**
Between grades	4	22.601	5.650	.62
S x G	4	7.414	1.854	.20
Subj. w. S x G cells	90	815.030	9.056	
Between testings	1	4.728	4.728	46.17**
T x S	1	.080	.080	.78
T x G	4	.434	.108	1.06
T x S x G	4	.841	.210	2.05
T x subj. w. S x G cells	90	9.214	.102	
Between eyes	1	3.990	3.990	7.69
E x S	1	2.311	2.311	4.45
E x G	4	4.668	1.167	2.25
E x S x G	4	.644	.161	.31
E x subj. w. S x G cells‡	90	46.714	.519	
Between meridians	1	.300	.300	2.79
M x S	1	.781	.781	7.25**
M x G	4	.268	.067	.62
M x S x G	4	.184	.046	.43
M x subj. w. S x G cells	90	9.702	.108	
T x E	1	.125	.125	3.01
T x E x S	1	.090	.090	2.18
T x E x G	4	.430	.108	2.59*
T x E x S x G	4	.103	.026	.62
T x E x subj. w. S x G cells	90	3.736	.042	
T x M	1	.061	.061	1.63
T x M x S	1	.003	.003	.07
T x M x G	4	.319	.080	2.12
T x M x S x G	4	.378	.094	2.51*
T x M x subj. w. S x G cells	90	3.380	.038	
E x M	1	.911	.911	12.33**
E x M x S	1	.195	.195	2.64
E x M x G	4	.291	.073	.99
E x M x S x G	4	.245	.061	.83
E x M x subj. w. S x G cells	90	6.655	.074	

†Variables are designated by their first letters.
‡Homogeneity of variance assumption untenable.
*5% level.
**1% level.

more pronounced in one school than the other. The means reveal that a greater difference exists between the horizontal and vertical meridians among the city children than among the rural children: the difference is also in opposite directions for each school. The interaction, eyes by meridians, is interpreted in a similar manner. The means show that the difference between meridians is greater for the left eye than for the right eye; this difference between meridians is also in opposite directions for each eye. No attempt to explain these differences involving the meridian measurements is undertaken here. No significant difference between meridians when treated separately was found, but when interacting with schools or eyes, differences occurred.

TABLE 3

MEANS (IN DIOPTERS) CORRESPONDING TO SIGNIFICANT F-TESTS

3a. Single Variables

Source			*Means (in diopters)*	
Between schools	Rural	—.008	Urban	—.607
Between testings	Spring	—.384	Fall	—.231

3b. First Order Interactions

	Meridians x Schools			*Eyes x Meridians*	
	H	*V*		*H*	*V*
Rural	.004	—.020	Right	—.222	—.251
Urban	—.658	—.556	Left	—.431	—.325

3c. Second Order Interaction

Testings x Eyes x Grades

	Spring		*Fall*	
Grade	*Right*	*Left*	*Right*	*Left*
4	—.088	—.194	—.062	.006
5	—.350	—.556	—.138	—.362
6	—.369	—.431	—.219	—.206
7	—.300	—.294	—.075	—.156
8	—.400	—.862	—.369	—.725

Three variables acting together and producing a specific result constitute a second order interaction. The interaction of testings, eyes, and grades indicates that the differences between right and left eyes are different among the several grades and that this effect varies between spring and fall testings. Any further clarification of this interaction did not seem warranted, as no practical considerations seemed forthcoming. Likewise, the interaction involving testings, meridians, schools, and grades was not analyzed, since to visualize an interaction of four dimensions appeared difficult in itself, let alone determining any practical significance from it.

The F-ratios calculated for the group lacking in homogeneity of

variance cannot be interpreted by existing standards. The values of F for specific levels of significance under these conditions are not known: therefore, the magnitude of the obtained F-ratios cannot be evaluated for statistical significance. It might be suggested, however, that the value of F obtained between eyes (7.69) might be sufficiently large to indicate an actual difference between eyes. An examination of the means reveals a right eye mean of —.237 and a left eye mean of —.378. This might indicate that the left eye is more myopic than the right. If this be an actual difference, some interesting hypotheses could probably be advanced in explanation of it. Any common factors in classroom arrangement among schools would probably offer a good starting point for such hypotheses.

It should be emphasized that these interpretations of the obtained results apply only to the situation studied. However, it seems reasonable to suggest that the more significant of these results can be generalized to the school population as a whole, particularly the highly significant difference between the spring and fall testings.

Attempt to Correct Heterogeneity. The importance of any differences that might occur in the heterogeneous group seemed sufficient to warrant further investigation. Heterogeneity of variance is often caused by the presence of correlation between the means and variances within the experimental conditions. Therefore, the data were examined to determine whether such correlation existed, but no relationship was found. Had such correlation been evident, a transformation of the original data to a new scale would probably have corrected the difficulty. The purpose of such a transformation is to change the scale of measurement to one in which the variance is more homogeneous. Although correlation between the means and variances was lacking, a transformation to remove the heterogeneity was nevertheless sought. Various square root and logarithmic transformations were tried, but none would correct the difficulty.

Since a transformation would not help, it was undertaken to determine the source of the heterogeneity. To do this, the data involved were examined for obvious deviations from the average. Out of the one hundred subjects, it appeared that six subjects were causing the difficulty, as the differences between scores for their right and left eyes seemed rather extreme. It was felt that these six might have pathalogic conditions and that their eyes should be examined further. With this in mind these six children were re-examined by the optometrist, and five of them were found to exhibit signs of possible disease. Since data collected for some children had not been used in the study (in order

to maintain equal numbers for all grades), corresponding data for these five children were selected and substituted for them. With these revised data, the group in question was again tested for homogeneity of variance. The original corrected X^2 value was 64.898, and the new value was found to be 29.602. While this was a considerable reduction, the new value was still significant at the 1% level, indicating that heterogeneity still existed. Thus, the five children with possible pathologic conditions accounted for some of the variability within the group but not for all of it. Apparently there are still one or more variables present which have not been detected or considered. This might well form the basis for a further investigation.

SUMMARY AND CONCLUSIONS

Due largely to conflicting reports concerning changes in visual performance of school children during the summer vacation, the present study was designed to investigate this and other related variables. Retinoscopic examinations were administered to school children in grades four through eight in two schools representing rural and urban populations. These children were examined both in the spring and fall. The data thus obtained were analyzed by the technique of analysis of variance. Possible statistical differences among the variables—schools, grades, testings, eyes, and meridians—and their interactions could be detected in this manner. Prior to this analysis, the data were checked for homogeneity of variance. One of the groups of data did not satisfy this condition, and no specific interpretations were made for results in this group. What seemed to be the most logical interpretations were made for the rest of the findings.

The following conclusions are therefore drawn from this investigation:

1. A difference in visual performance exists between rural and urban school children: the rural children are nearly emmetropic while the urban children are more myopic.
2. A definite change in visual status occurs during the summer vacation period for school children: a lesser degree of myopia is exhibited in the fall than in the spring.
3. The meridian measurements interact with both schools and eyes. A greater difference exists between the horizontal and vertical meridians among city children than among rural children: the difference between meridians is also greater for the left eye than the right eye.
4. A difference may exist between right and left eyes, the left

eye being more myopic. Due to heterogeneity of variance, this cannot be stated definitely.

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INSTRUMENT REVIEW

PSEUDO-ISOCHROMATIC PLATES. Second edition. Israel Dvorine, O.D., F.A.A.O. 2328 Eutaw Place. Baltimore 17, Maryland. $12.00. 1953.

The new set of plates has been condensed into one volume and consists of the more highly diagnostic plates of the first edition. These plates were selected by Dr. Louise L. Sloan of Johns Hopkins Hospital and were described in the JOURNAL OF THE OPTICAL SOCIETY OF AMERICA, Vol. 35, No. 12. Additional plates have been added with new color combinations, in order to make this set the most sensitive color test yet devised for the selection of the red-green color-blind. Another new feature is the special section specifically designed to test preschool-age children and illiterates. The plates of this section can also be used to retest individuals who failed the group of plates in the first section of the book.

The new set contains eight different groups of color combinations. The unique design of the plates which places all colored dots in the same relative position on each plate, to prevent malingerers from identifying the plates, is an advantage. Each plate is limited to specific confusion colors, to aid in the diagnosis, and the eccentric arrangement of the numbers on the plates, aids in positive identification. The pages are mounted in a loose-leaf six ring cloth-covered durable binder to permit the examiner to change the sequence of the plates, to outwit the malingerer, if this is necessary.

AUTHOR'S REVIEW

THE ELECTRICAL RESPONSES OF THE EYE*

PART IV. SOME SENSORY AND CLINICAL CORRELATES

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A number of interesting deductions may be drawn by comparing the results obtained with electrophysiologic techniques with those established by the more usual sensory methods. Certain relations of this type have already been suggested by the previous paragraphs‡ and we now propose to consider some of these in greater detail.

The behavior of the electroretinogram and optic nerve discharge have suggested certain modifications of the duplicity theory. Such modifications had already been proposed from the standpoint of sensory and anatomic observations. (c.f., Michaels, 1952.) Specifically, it was found that in order for the theory to be in keeping with electrophysiologic results it must be extended to include the entire synaptic neuron chain associated with the rod and cone photoreceptors. When one considers that the ERG is a cumulative response, representing diverse elements, and that it may be used to demonstrate the Purkinje shift, such an extension of the theory seems reasonable. Granit and Wrede (1937) investigated the responses of the frog eye to various wave lengths and found, in fact, a well marked Purkinje shift (Figure 22). Thus when the size of the b-wave is plotted against wave length, two curves are obtained, one of which has its maximum at 507 $m\mu$ and the other at 560 $m\mu$. The rod and cone curves may be separated by appropriate choice of stimuli. Now the b-wave is associated with the P-II component which is in turn believed not to arise in the photoreceptors but in the intermediate neurons, e.g., the bipolars. It might, of course, be argued that the P-II component simply reflects the earlier imposed rod-cone differentiation. On the other hand, Therman (1938) found that the isolated P-III component also manifests a Purkinje shift. This is rather surprising in terms of the belief that P-III is associated with the cone pathways exclusively. This difficulty

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‡Part I, Responses of Single Photoreceptors, appeared in the September issue. Part II, Optic Nerve Responses of Complex Eyes, appeared in the October issue. Part III, The Electroretinogram, appeared in the November issue.

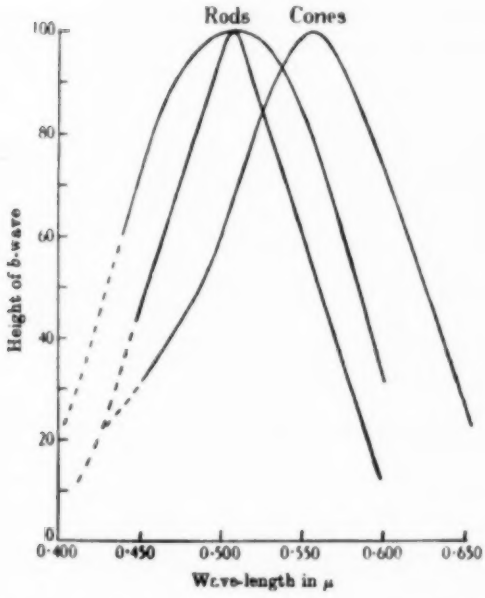

Fig. 22. Relation of the size of the b-wave to the wave-length of the stimulus for the rods and cones of the frog. Maximum b-wave with a stimulus of 0.507 u for the rods (Granit and Munsterhjelm, 1937, J. Physiol., 88) and at 0.560 u for the cones. (Granit and Wrede, 1937, J. Physiol., 89.)

may be resolved, however, when we know more about this inhibition process. Finally, if the size of the positive potential of the ERG (e.g., the b-wave) is plotted against the logarithm of the intensity of the stimulus, the resultant curve is steeper for the cone (high intensity) than for the rod (low intensity) region. Such curves are what might have been expected from sensory observations. It may be concluded that the electrophysiologic results support the extension of the duplicity theory to a differentiation of neuron systems rather than photoreceptors.

The responses of the ERG to light and dark adaptation provide some further illuminating results. In the mixed E-retina of the cat, light adaptation results in the disappearance of P-I and a considerable decrease in P-II, while P-III, being a small potential, is hardly affected. In the mixed I-retina of the frog, light adaptation results in a disappearance of P-I; P-II is also reduced although it is more resistant than in the E-type; P-III is enhanced. The mixed I-type retina may be transformed from an E-type response in the dark to an I-type response

by light adaptation.* Thus dark adaptation of the frog eye results in the appearance of P-I, enhancement of P-II and a reduction of P-III (Figure 23).

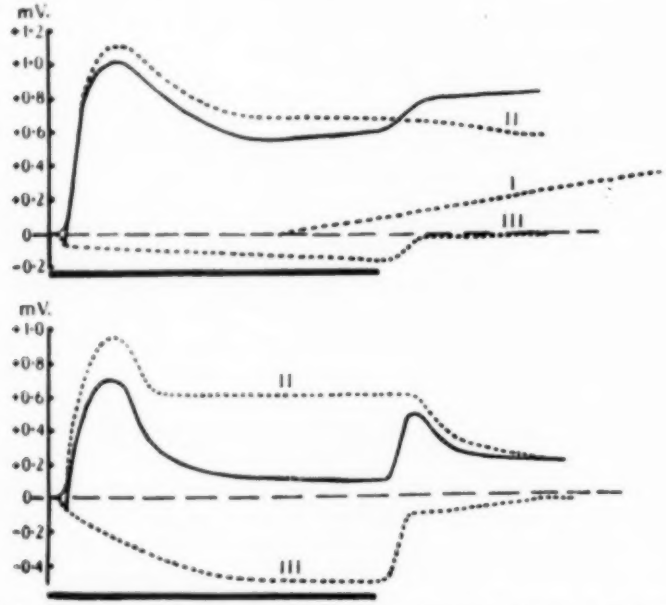

Fig. 23. Analysis of the I-electroretinogram. *Upper*, dark adapted. *Lower*, light adapted. Duration of stimulus: 2 sec. (Granit and Riddell, 1934, J. Physiol., 81.)

Another interesting effect of adaptation is illustrated by the following experiment. When the dark adapted frog eye is stimulated, a relatively large b-wave is obtained. If a second flash is applied immediately afterwards, some time must elapse before a second wave appears. If the eye is allowed to light adapt, however, the second test flash evokes a b-wave within a fraction of a second. Granit (1938) concludes that whereas the scotopic retina is sluggish and has poor discrimination, some degree of light adaptation suffices to enable the eye to record the added energy as a separate b-wave, starting a new burst of impulses through the optic nerve. It is as though light adaptation were somehow able to reset the retinal recording instrument from "slow" to "fast."

*Except for the Pigeon which has a mixed cone dominant I-type retina, relatively independent of the state of adaptation.

This conclusion is of course in accord with the sensorially observed dominance of photopic over scotopic discrimination. Further evidence for such a conclusion is available. When the frog eye is stimulated intermittently by light (Granit and Riddell, 1934) results such as

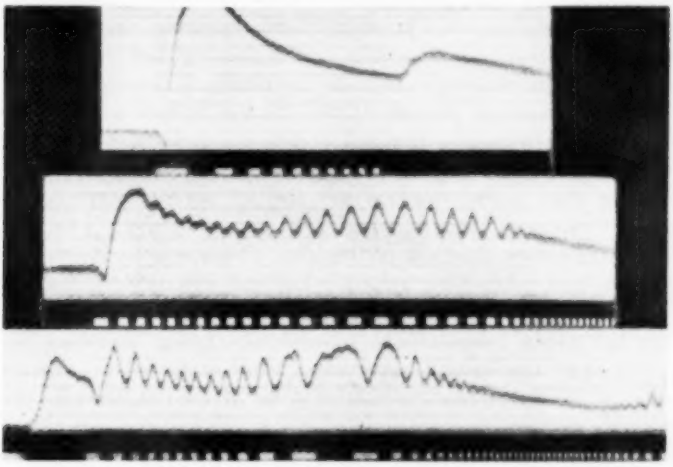

Fig. 24. Effect of adaptation on the response of the frog retina to intermittent stimulation. A, electroretinogram of the completely dark adapted eye; B and C, after light adaptation. Max. b-wave about 1.0 mV. Intensity of stimulus 1,800 m.c. (Granit and Riddell, 1934, J. Physiol., 81.)

are illustrated in Figure 24, may be observed. It will be noted that the dark adapted retina reacts so slowly that it cannot follow the individual flashes whereas five minutes of light adaptation give brisk wavelets, synchronized with the individual stimuli. The fusion frequency in this particular experiment was 13 flashes/second in the light adapted eye and 7 flashes/second after 15 minutes of dark adaptation.* This serves to confirm the view that the light adapted eye, although less sensitive, is much faster and capable of differentiating between intensities to a greater extent than the dark adapted eye. It can be further shown (Bernhard and Skoglund, 1941) that at least in the frog retina, the ability to follow rapid changes in illumination is dependent on P-III. Thus, alcohol which decreases P-III also lowers the fusion frequency. Since P-III is associated with pre-excitatory inhibition (i.e., the a-wave) it is concluded that an accurate response

*It is interesting to compare these results to those obtained by attempting to "drive" the electroencephalographic waves by intermittent light stimuli. These comparisons are, however, beyond the scope of the present paper.

to flicker must entail a rapid alternation between pre-excitatory inhibition and excitation.

The above data are in accord with the notion that the E-type response is associated with rod dominance and the I-type with cone dominant retinas. They therefore fit into the extended scheme of the duplicity theory. It must be emphasized, however, that the I and E classification serves only as a first approximation and that its original basis lies in the observed difference in electrical response rather than anatomic structure of certain retinas. Granit himself has pointed out that there is always the possibility that the possession of an E-type response may merely distinguish mammals from the other vertebrates.

The data reported above are also of great importance in the general problem of discrimination. Wright and Granit (1938) have already made some progress in this area. They emphasize the play of excitation and inhibition, amplification and variation in the response of distinct types of optic nerve fibers, assigning a major role to the slight but rapid irregular eye movements. Other investigators have also followed this line of approach (Weymouth, 1928; Talbot and Marshall, 1942). I have considered some of the problems involved in this area elsewhere (Michaels, 1952).

Wright and Granit (1938) following Adrian and Matthews, compared the time course of continuous/intermittent visual brightness to the rise of frequency of discharge in the eel's optic nerve (Figure 25). It will be seen that the brightness first rapidly increases towards a

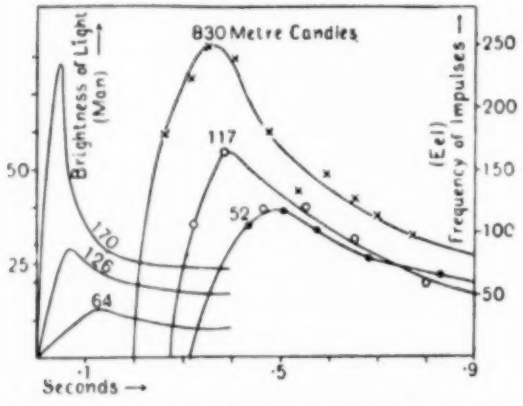

Fig. 25. Comparison of the rise in the sensation of brightness in man (Broca and Sulzer) with the rise in frequency of the discharge in the optic nerve of the eel. (Adrian and Matthews.) (Adrian, 1928, The Basis of Sensation. London.)

maximum and then falls off. Similarly both the positive component of the ERG and the frequency of the nerve discharge rises and falls along a similar curve. Since, however, the experimental results of Broca and Sulzer have been almost universally misquoted or mistranslated as has recently been pointed out by Walls, and since Broca and Sulzer themselves cautioned against the crudeness of their results (the data were obtained in 1902) the above comparison, for the present purposes, does not mean much more than the existence of a rough similarity in the shape of the curves. Any quantitative comparative reasoning must be viewed with caution.

Wright and Granit have attempted to correlate the off-effect with an after-image. They write:

"Both off-effect and after-image show periodicity, the former owing to synchronized groups of impulses. On the other hand, there can be no doubt that the higher centers also contribute to the periodicity observed in the after-images. This is indicated by all the work on the visual cortex. As pointed out above, the difficulty encountered in trying to correlate the off-effects and after-images arises from the lack of quantitative information about the time course of the sensory change of brightness of the after-images. In view of the fact that the off-effect is so easily inhibited by reillumination, it is highly probable that the elusiveness of the after-image, apart from the difficulties of fixation, is due to its being inhibited by any light falling into the eye."

The relationship between electrophysiologic studies and the sensory phenomena of color vision which is, in a way, the most dramatic contribution, is outside the scope of the present paper. It would require too much space even to summarize it and in order to avoid an injustice to much careful and painstaking research, I have deliberately omitted this subject. The reader is referred to Granit's 1947 monograph for a detailed account of this as well as the other aspects of retinal electrophysiology.* Suffice it to point out that in this as well as in almost every other area of vision, the theoretical formulations based on sensory and perceptual observations have been made subject to modification and confirmation as the result of the work here described. In the brief span of a few decades the empirical observations have received an objective physiological basis beyond the greatest expectations of the earlier workers.

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*The literature on electro-oculography has recently been reviewed and summarized by Marg, 1951. Lipetz (1953) has published the results of his studies of the retinal responses to Roentgen rays. Motokawa *et al* have studied the responses of the retina and their relation to color vision.

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ANNOUNCEMENT

HIGH-RESOLUTION LENS SEMINARS

The use of high resolution microscopic and telescopic spectacles is being taught in a series of special post-graduate clinical seminars conducted at Chicago College of Optometry. Each seminar consists of six full days of clinical instruction. The initial two day session for the first seminar was held on December 9-10, 1953, and the remaining four one-day sessions will be held on January 6, February 3, March 3, and April, 7, 1954.

Only optometrists or ophthalmologists who are members in good standing of their state associations will be eligible to attend the seminars.

Dr. William Feinbloom, designer of the new "clear image" high resolution lenses, has established a policy of not furnishing his lenses to lay technicians or opticians, but only to professional optometrists or ophthalmologists who have had proper training in the field. He will accept the certificate of completion of an approved clinical seminar, such as those now given at Chicago College, as evidence of such training.

Charity patients will be available at the clinical seminars for those practitioners who do not have private patients of their own to work with.

The seminars at Chicago College of Optometry are conducted by Dr. Eugene Freeman, dean of the college, one of the pioneers in this field. The fee for the six-day clinical seminar is $200, of which $50 is payable on registration.

Enrollment for the first seminar was limited to 12 practitioners. Additional seminars will be announced in the Spring of 1954. Information on these may be had by writing to Miss G. Selg, Chicago College of Optometry, 1849 N. Larrabee St., Chicago 14, Illinois.

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SEASONS GREETINGS TO YOU

Each year at this time, it is the pleasure of the Journal staff to extend our sincere wish for a joyous and pleasant holiday season to our contributors, subscribers, agents and advertisers.

Christmas draws us all closer together in a fine spirit of friendship that grows throughout the year, increasing our happiness and rewarding us with the pleasure of working together as a group for better visual care in the public's interest.

May you welcome the New Year in fine health and good spirits and in 1954 have a most prosperous year.

CAREL C. KOCH

A REPLY BY THE GUILD*

A reply to Carel Koch's paper entitled, *"Problems with Dispensing Opticians,"* which appeared in the June and August, 1953, issues of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY was written by Henry B. Carpenter for the October, 1953, issue of GUILDCRAFT, which is published by the Guild of Prescription Opticians of America. Along with Carpenter's article, GUILDCRAFT published as a separate insert the entire text of Part I and Part II of Koch's paper. Because few optometrists ever see GUILDCRAFT, a review of his comments is in order.

Mr. Carpenter is a representative of opticianry on the National Interprofessional Committee on Eye Care. He is a past-president of the Guild. After reading his paper entitled, *"Is There a 'Pattern'?"*, one can begin to appreciate some of the enormous difficulties under which this committee must have operated. An extraordinary amount of tact and forebearance undoubtedly must have been required just to keep the committee together.

Carpenter's reply to Koch consists for the most part of a counter-charge that optometry rather than opticianry or ophthalmology is responsible for the friction between these three groups. Carpenter sees a pattern taking shape in the actions of optometry's political leaders. This pattern he reconstructs into a plot to push opticianry completely out of the field of dispensing, and ophthalmology completely out of the field of refraction.

According to Carpenter, the political leaders of optometry now realize that optometry has "over-expanded" to such an extent that if optometry remains in its own rightful sphere, it cannot hope for economic survival. Optometry has therefore, according to Carpenter, drawn up a blue print for its own survival which disregards public welfare and the legal rights of opticianry and ophthalmology. The pattern on this blue print is being disclosed by "aggressive legal actions" taken by optometry in various states for the purpose of depriving opticianry of its just rights.

In Carpenter's own words:

> The present uneconomic position of Optometry is probably the predominating reason for disharmony. In its desire to dominate it has over-expanded. In its desire to dominate it is seeking standards of education in excess of what is necessary for its refractive type of practice and, consequently, in excess of the financial returns it can expect. It must, therefore, resort to any means or methods to acquire the practices of others for survival, in the opinion of its political leaders.

*By Eugene Freeman, Optometrist, Ph.D., Vice-President and Dean, Chicago College of Optometry, Fellow, American Academy of Optometry.

This is the theme in a recent article by the President Emeritus of one of the leading Optometric Schools, deploring this attitude.

Optometry could gain greater respect, do itself a much greater service and better serve harmony in eye care if it carefully re-examined its entire national educational and economic position to the end that it give increased attention to the services it is by law entitled to perform, and forsook its interest in the practices of others. It would gain immeasurably in both public and professional regard and respect.

As evidence of the conspiracy or "pattern" which is charged vaguely by Carpenter to "Optometry" or sometimes to the political leaders of optometry, none of whom are mentioned by name, he cites the legal attacks made in several states upon the dispensing optician by optometry.

Quoting again from Carpenter:

As this article is being prepared still another violation of harmony is being perpetrated. The Oklahoma State Optometrical Society has succeeded in passing legislation to deny the right to any Optician to duplicate, replace or reproduce any lens except on an original prescription.

Because of his infinitely greater experience in verification and analysis, the Optician is equally more capable of lens diagnosis. Yet, to improve its economic position, Optometry without regard for public convenience and personal desires, by legal edict, compels the public to submit to Optometric service in times of personal misfortune.

In at least three States, Optometrical Societies have demonstrated the existence of a "pattern" *by selecting Opticians without affiliations* and charging them with the practice of Optometry in their adapting and fitting spectacles in accordance with the prescription of an Eye Physician for the aid and correction of human vision.

These attempts culminated in a successful attack in the State of Louisiana in June, 1953. Using the restrictive rather than the permissive interpretation of its Optometry Law, after it existed for many years without being challenged, Optometry was successful in having the State Supreme Court declare that adaptation and fitting of spectacles to the human eyes was, by Statute, in some respects an Optometric function.

The Court could have been influenced in its decision for several reasons, one of which was the cleverly presented contentions of the plaintiff, the Louisiana Optometrical Society, to the effect that only an Optometrist was qualified to fit a pair of corrective spectacles to the human eyes.

The limited training available to the Optometric student, the limited opportunity to render and gain such experience in the fitting of the few spectacles possible in the average optometric office in comparison to the years devoted exclusively to such services in the average dispensing practice bespeaks, in unmistakable terms, the true objectives of this State Society.

Certainly it did not bring this suit in the interest of its "competitor," the Ophthalmologists of Louisiana, who use the services of the dispensers for their refractive patient care in this State.

Certainly since the Optometric Law has been in existence for many, many years, this latest action could not be called in the public's interest.

Then the question must be asked, in whose interest were the Courts of the State used, and, "Is There a Pattern"?

Regardless of its consuming interest in its practice and patient care, it becomes essential that the dominant body in eye care, national Ophthalmology, take cognizance of these aggressive legal actions.

Still Optometry verbally contends it is the major proponent of harmony.

There appears to be but one road, and it, a one way street.

Carpenter's charges are based on isolated actions occurring at the state level in optometry which are in conflict with the official policies of optometry as expressed at the national level. The policy of the

American Optometric Association is found in a resolution written two years ago, namely:

> Since it has been the declared policy of the American Optometric Association not *to fill prescriptions originating with any other practitioner*, optometry has no desire to interfere with opticianry in carrying out this activity. Optometry appreciates that many Ophthalmologists have their prescriptions filled by Opticians and Optometry has no desire in any way to modify, impair or interfere with that relationship.

Carpenter anticipates this reply by quoting the above resolution himself, and offering the following rejoinder to the anticipated reply. In his own words:

> Two years ago it [optometry] passed a resolution, previously quoted in whole, to the effect that it had no desire to interfere with the dispenser rendering his services to the patient of the Ophthalmologist and that it was unethical for any Optometrical practitioner to fill a refractive prescription (originating with an Ophthalmologist).
>
> Yet, today over 90% of all Optometrists not only fill prescriptions of Ophthalmologists, but seek them; many of them even to the extent of putting on their store fronts and stationery the terms Optometrists and Opticians.
>
> National Optometric leaders issued this official resolution. Since it is not enforceable and no attempt has ever been made to enforce either of its provisions, the sincerity of it must be questioned and placed in the same category with its other expressions for harmony.
>
> For while Optometry's political leaders, seeking Ophthalmological collaboration, expound such phrases at the national level, the same leaders at the State and County levels engage in Court and legislative procedures directly opposite to what it would have us so naively accept as the promoter of harmony.
>
> National Optometry offers as an excuse that it cannot control the activities of State Societies. First, of a necessity every national leader rose to this level through his State leadership and, second, until it can control the aggressiveness of its local members, it should cease asking for additional privileges for these same locals, at the national level.
>
> It is senseless to accept verbal expressions of harmony unless by deed they are demonstrated.

Carpenter concludes by making three proposals:

1. The duties and prerogatives of each group in the eye care field should be defined by the Inter-professional Committee on Eye Care and should be formally adopted by each parent association.

2. The project of obtaining licensure for the Ophthalmic Dispenser should be supported by the committee, and its aid should be enlisted in the formulation of a model bill.

3. It is unreasonable of optometry to object to the refusal of opticianry to refer patients to optometry on an equal basis with ophthalmology, for two reasons. (a) If the educational requirements of the two professions were equal, then optometry would be entitled to equality and non-discrimination in referrals, but since the educational requirements of ophthalmology are higher than those of optometry, the optician is justified in referring patients to the better trained and qualified practitioners. (b) The average optometrist's principal source of income is derived from dispensing services. If the optician were to send refractive cases to optometry, it would be absurd for him to expect

that even a single case would be returned by the optometrist to the optician for dispensing.

It is apparent from a reading of Carpenter's paper, that dispensing opticianry—or at least that segment of it which is represented by the thinking of the Guild of Prescription Opticians of America—was incensed by Koch's paper on *"Problems with Dispensing Opticians."*

It is also apparent that optometry cannot be expected to receive Carpenter's paper as a sincere effort to bring about a closer accord between the two groups. What Carpenter has done—and most effectively—is to show how important to the optician are the principles of economic self-interest which as a business man he must place before any other consideration. Would Carpenter have the same reluctance to refer patients to optometrists for refractions if ophthalmologists dispensed materials to their own patients, but optometrists referred them back to the optician for dispensing services?

There is a real need for idealism in high places, but nevertheless, if a committee like the Interprofessional Committee on Eye Care is to come any closer to its goal of bringing about a closer harmony between the three groups it represents, it must temper its idealism with a more realistic consideration of the economic self-interests which are more or less dominant motivating factors in the thinking of the groups which the committee represents.

EUGENE FREEMAN

ABSTRACT

MY EXPERIENCE AS AN INDUSTRIAL VISION CONSULTANT. H. C. Kline. Optometric Weekly. 44.26. 1089-1092. 1953.

The author reviews his experiences in occupational optometry. He serves as an industrial vision consultant at a number of plants. He points out that the problems presented at each plant are individual and must be treated as such. In every case team work is essential as the optometrist in industry must work with nurses, physicians, union officials, personnel people, safety supervisors and management. Whatever programs are adopted must run smoothly. The author then presents the step-by-step techniques followed in performing his services at the Bridgeport Thermostat Company. He concludes that more than 40 per cent of the workers in industry need additional eye care.

TERRY JUDITH PARKINS.

SPECIAL REPORT

THIRD PARTY INTEREST IN VISUAL CARE*

William T. Cameron†
American Optical Company
Southbridge, Massachusetts

It has been stated[1] that America has the highest level of visual care in the world. According to several authorities[2], we in the United States have more ophthalmic specialists per capita, a higher level of professional attainment, and spend more money on eye health and visual efficiency than any other nation on the face of the globe. Our ophthalmic attainments include more precise instrumentation, a wider range of lens types, corrected for marginal error and available in a multiplicity of special purpose combinations, an almost limitless selection of cosmetically attractive frames and mountings designed to overcome the social attitude against wearing glasses, and finally a network of laboratory facilities reaching into virtually every city and town in the nation. At the same time, we appear to have more official agencies, social welfare groups, administrative and management bodies concerned with the visual status of particular segments of the public than can be found in any other part of the world.

Based upon observations made over the past 25 years—as an industrial Safety Engineer—as a government bureau employee—and more recently as a member of the optical industry, it is my conviction that America's position of leadership in vision is, to a considerable extent, a result of "Third Party Interest in Visual Care." If it were not for the school administrator's solicitude for the visual welfare of the children under his jurisdiction, the employer's interest in the vision of his employees, or the State and federal governments' administrative concern for the visual health and welfare of large groups of its citizens, there is every reason to believe that far fewer persons would find their way into the offices of the nation's ophthalmic practitioners.

Published reports of school,[3, 4] industry,[5, 6, 7] and government[8, 9] sponsored vision screening projects invariably refer with surprise to

*Read before the annual meeting of the American Academy of Optometry, Section on Occupational Optometry, Rochester, New York, December 8, 1952. For publication in the December, 1953, issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY.
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the large number of persons with unsuspected visual handicaps, inadequate or out-of-date prescriptions, or with seeing problems of which neither the individual nor his employer, teacher or parent, was aware. Unlike many other bodily ailments, inefficient eyesight 'doesn't hurt." The individual is usually not conscious of the gradual onset of lowered visual efficiency, while his boss or teacher is apt to think of him as "retarded," "careless," or "stupid," rather than burdened with a visual handicap. Therefore: any activity which systematically and regularly subjects large areas of the population to vision checking procedures is making a contribution to vocational and occupational achievement as well as to the visual health, efficiency, and comfort of the nation.

A review of the number and extent of "third party" influences on visual care makes one wonder if anybody seeks eye care wholly on his own initiative. Prominent among these "outside" influences are the following:

1. School authorities—at all levels—national, State and local. These include the U. S. Office of Education, State boards of education, various associations of educators and individual school administrators. Twenty states now have specific regulations, directives or laws requiring routine vision testing in schools. There are 186,000[10] school systems including public, private, and college with upward of 35,000,000 students,[11] a large proportion of whom are now having their vision checked upon entrance and at periodic intervals thereafter by school teachers, school nurses or by professional visual consultants. The best available statistics[3, 4, 12, 18] indicate that on an average for all levels, about 20% to 30% of the current school population have correctable visual difficulties—a minimum of 7,000,000 potential recipients of professional visual attention.

2. Employers. Interest in visual efficiency on the part of industrial and business management probably affects the largest segment of the population. At present, most large employers of labor have in effect some system or other for checking the visual capabilities of applicants for employment. Many of these also carry on systematic programs for the continued testing of payroll employees during the entire course of their employed life.

It is estimated that since the end of world war II some 5,000,000 employed persons have been referred for visual attention as a result of these industrial activities. However, contrary to the popular conception, probably not more than 20% of the country's 60,000,000 employed persons are embraced by these industrial eye care plans. Whenever an

industry institutes a vision screening plan, some 35% to 40%[5, 6, 7] of the employees are found to be in need of visual care.

3. Unions. In recent years, the larger industrial unions have instituted a variety of health and welfare measures which often include visual services for the membership. The union eye care plans usually provide for the rendering of these services by a full-time practitioner who carries on his activities at a union health center. The author was unable to determine how many persons received their visual care through union sponsored plans, but there is every indication that this type of "third party" participation will continue to grow.

4. Government influences at the State level. State government "responsibility" for vision covers a surprisingly large number of its citizens. For instance, the State department of public health is often designated as the agency to conduct vision testing in schools in collaboration with the State department of education. Multiphasic screening activities conducted on a clinic basis, or carried to small plants and rural communities in mobile units, often include vision screening tests.

In 47 of the 48 states and in the District of Columbia, the State motor vehicle licensing authorities have established legal levels of visual acuity (and occasionally standards for other elements of vision) as a requirement for securing a license to operate a motor vehicle.[14] Although many states require a vision test only at the time of the original license application, others include a vision test each time the license is renewed.

State labor departments and State workman's compensation boards exert considerable influence on the ophthalmic field. Although not carrying on vision *testing* activities, these State agencies impose on employers health and safety laws, rules or regulations which virtually make it mandatory for industrial and business management to institute measures for the protection and correction of their employees' vision.

There are other State agencies such as those that provide for the visual care of the inmates of prisons, mental and other institutions, or for indigent persons or welfare cases.

5. The Federal government's influence on visual care falls into two categories: a) activities designed to assist the private citizen and b) those instituted for civil service employees and military personnel. An example of the first is the work of the United States Public Health Service. This agency's relation to the eye care field is felt through "grants-in-aid" to State health departments and through direct

activities carried on by its staff members located not only in Washington but throughout the country. Now under discussion is the possibility of including mass vision testing of the general public under a multiphasic screening project similar to the work that has been done in the control of tuberculosis and venereal diseases.

An example of the second category is the work of the United States Post Office department which has recently started an experimental vision screening project among post office and railway mail service personnel—an activity which may eventually reach into every community in the United States.

Both military and civilian personnel under the jurisdiction of the army, navy, and air force are the recipients of extensive visual care either through service maintained facilities or through screening activities and referrals to private practitioners.

The interstate commerce commission together with its bureau of motor carriers imposes stringent regulations upon the railroads and upon bus and truck operators, in regard to the vision of engineers, trainmen, truck and bus drivers. In the railroad industry, especially, these regulations have given rise to elaborate arrangements for periodically checking and maintaining vision at a high level.

Other government agencies engaging in one or another form of eye care include the veteran's administration, the office of Indian affairs, the bureau of prisons, Tennessee valley authority, and the atomic energy commission.

6. To return to private enterprise, we find that the insurance companies — particularly the workman's compensation insurance carriers—are a potent force in the promotion of industrial eye protection and visual efficiency measures. The advisory services of insurance field engineers and, more important, the fact that insurance rates are based upon accident costs, have led to the adoption of extensive eye safety and corrective-protective procedures, all of which have their effect on private ophthalmic practice.

7. The National Society for the Prevention of Blindness has for many years been carrying on promotional activities in the interest of greater eye health, protection and rehabilitation. The work carried on by this society has been effective in arousing parents, school authorities, industrial organizations, and public officials to the need for constant attention to ocular protection, visual efficiency and hygiene.

8. Safety equipment and ophthalmic product manufacturers through the publication and distribution of manuals, handbooks and

other advisory material, as well as through sales and advertising activities, constitute another "third party" contributing to the level of eye health and safety now enjoyed by the nation.

9. Various service clubs, particularly the Lions, devote considerable time, energy, and money to advancing the cause of eye care through the furnishing of screening equipment to schools and underwriting the cost of visual care for the needy.

10. To this list should be added the promotional activities of the Better Vision Institute, and what might be termed editorial influence. This editorial influence includes popular magazine articles as well as the many articles that appear in school, industrial and professional journals.

While this list of "third parties" is far from complete, it does give an indication of the official and private influences in the visual care field.

ECONOMIC INTRUSION

While unquestionably "third-party" interest in visual care is an asset to the ophthalmic practitioner, it is not without its liabilities. Perhaps of greatest concern to the private practitioner is the economic intrusion which often results when a third party invades the normal two-way doctor-patient relationship. In some instances this economic intrusion is welcome and necessary as when a service club pays for the visual care of a needy child, or a State welfare agency the fee for an indigent family. On the other hand, "third party" intervention in the matter of professional fees can seriously disturb the economics of the private practitioner. To paraphrase Rieke[15] "—the third party soon becomes quite expert in how to get things for less. Through its statistics it learns that some doctors cost less, ask and complain less, and insist upon less for the patient. Gradually the authority ventures into uniform rules and regulations in the interest of cost control and, purportedly, in high standards of performance. These two contradictory terms have not been teamed readily by authorities of my acquaintance, but not for lack of trying."

Twenty-six States have established "minimum fee schedules" for eye care services either for the handling of welfare patients or in the payment of fees in connection with workman's compensation cases. Incidentally, the average "welfare fee" for the nineteen states having such a schedule is $7.37—the average industrial fee, $11.15. These latter range from a low of $3 in New Hampshire and Oregon to $16.20 in the State of New York. (See Table I.)

TABLE I
STATE PROMULGATED MINIMUM FEE SCHEDULES FOR "EYE EXAMINATION, REFRACTION, ETC." (OPHTHALMIC MATERIALS NOT INCLUDED)
(1951)

	Welfare Cases	*Industrial Cases*		*Welfare Cases*	*Industrial Cases*
Arizona		$12.00	New Hampshire	$ 3.00	
Arkansas	$ 7.00	10.00	New York		$16.20
California	10.00		North Carolina		10.00
Colorado	10.00	10.00	North Dakota	7.00	
Connecticut	4.00		Ohio		15.00
Florida	10.00	12.50	Oregon	3.00	
Idaho		7.00	Pennsylvania	4.00	
Illinois	5-7.00		Rhode Island	12.00	
Kansas	10.00	10.00	South Carolina	3-5.00	
Michigan	10.00		Tennessee	7.50	
Missouri	5-10.00		Texas	10.00	
Montana	5.00		West Virginia		10.00
Nevada	10.00		Wyoming		10.00

Another type of economic intrusion is that which results from industrial concerns and government agencies contracting directly with safety supply houses or optical laboratories for corrective-protective safety glasses and goggles. Under these plans, the employee usually is expected to pay his practitioner for prescribing, verifying, fitting, and servicing materials furnished by a third party. Establishing a fee schedule for these partial service patients is causing considerable embarrassment to practitioners who in the past contended their services were free or who otherwise derived some or all of their income from profit on ophthalmic materials. This is perhaps the most difficult third party liability to deal with at the present time.

TECHNICAL INTERFERENCE

High on the list of problems associated with "third party" visual care is "technical interference." In the main, this results from indiscriminate use of visual screening devices by lay technicians. Although screening device manufacturers are sensitive to the needs of the ophthalmic professions, we occasionally find nonprofessional operators of screening instruments making pseudo-diagnostic statements to the subjects they are testing, drawing incorrect conclusions from screening data, promising more in the way of corrective measures than the professions can deliver, or upon rescreening a subject following correction, criticizing the effectiveness of the doctor's corrective measures. There is the ever present danger that as visual screening techniques are adopted by more and more "third parties" there will come a time when the "lay technicians" will organize, start holding conventions, begin passing

resolutions and seek legislative protection for their "profession."

Other areas of technical interference, which plague all branches of the health professions, include the promotion and sale of ready-made, self-administered remedies, patent medicines, and in the eye care field, glazed goods. Another irritation is the advertising by pharmaceutical and therapeutic device manufacturers of particular products which place the doctor in the position of a dealer in certain advertised products. Carried to the extreme, it is like saying to the public—"go to your neighborhood doctor and *demand* Smith's Look-O-Lenses—accurate at the very center—accept no substitute—demand Look-O-Lenses."

ADMINISTRATIVE INTERFERENCE

Perhaps the most frustrating problem inherent in "third party" health care is "administrative interference." A sponsoring organization or an administrative body that undertakes to direct a visual rehabilitation program (including payment for some or all of the professional fees) often imposes procedures and systems which are quite at variance with normal practice. Whether the "third party" be an employer, an insurance company, a State or federal agency, a union or a school board, the "controls" imposed often result in extensive paper work, red tape, divided loyalties, short-cut methods and an invasion of the confidences of the traditional doctor-patient relationship. For instance, one doctor of my acquaintance who does considerable industrial work tells me that he often spends up to three hours daily filling out forms and preparing other communications of information to third parties who require elaborate reports, burdensome letters, or multiple copies of statements and invoices.

Again paraphrasing Rieke,[15] "—basic in all areas of health care is the principle that the patient should have full and complete faith in his doctor, should feel that the doctor has one and only one interest (the patient's welfare) and that the patient can divulge his innermost secrets in complete confidence. When a 'third party' enters this picture nothing is completely confidential—the administrative agency 'must' have certain information or it will not 'play ball.' If the doctor violates basic confidences he stands to lose the patient's trust, and becomes known as 'the company doctor'—the 'insurance doctor' or some equally objectionable title which tends to destroy his private practice. On the other hand, if he fails to comply with the requirements of the administrative authority, he wakes up one day to discover that his name is no longer on the 'approved list.'

"Out of 'third party' health care there develops all too often a

state of mind in which the 'authority' knows better than the doctor what is, and is not, good for the patient. This often includes such things as: securing 'prior approval' for necessary corrective measures, facing the possibility that after the care is given the 'authority' may refuse all responsibility, or question the efficacy of the treatment provided. Consider the mixed emotions of the doctor whose bill is to be paid by the 'authority' but whose basic loyalty is to his patient when he finds that a report of his examination to the 'authority' will result in the denial of a truck driver's license to drive, or a crane operator being 'grounded'."

As of now, the practitioner can make his own decision as to whether or not he wants to become involved in "third party" visual care, and if so, to what extent. If he chooses, he can still remain a strictly private practitioner. It is not the purpose of this paper to forecast the status of the ophthalmic specialist of the future should administrative responsibility for all phases of health care be vested in a "supreme authority." One has only to investigate the status of the ophthalmic practitioner under the original British optical system to realize what happens to doctor and patient alike when "third party" visual care is carried to its ultimate end.

Neither will an attempt be made in this paper to advocate a course of action or to take sides for or against "third party" participation in visual care. On one hand we have seen that interests and activities originating outside of the "professional family" have resulted in a greater demand for ophthalmic services and a degree of public acceptance which places visual care high on the list of health measures. On the other hand, we have seen that "third party" intrusion into this field is not without its irritations, controversies and economic problems.

Members of the several professional groups cannot remain oblivious to the "third party," for, regardless of fears or apprehensions, the facts remain that an ever increasing demand for specialized eye care does exist, and that numerous elements of society are searching for a greater distribution of all types of health services.

The eyes of America—160,000,000 pairs of them—are demanding attention not only by the individuals concerned, but increasingly by public and private agencies—and their care, preservation, and correction cannot wait while the social, economic and other issues are being debated. Individual practitioners, as well as the professional organizations, have, it seems to me, a clear-cut obligation to keep informed, to

guide and direct, and above all to be continually alert to long term trends that may not be in the public interest.

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ANNOUNCEMENT

FRY TO PRESENT REVISED CURRICULUM REPORT AT SEATTLE

The Association of Schools and Colleges of Optometry will discuss the six year optometry curriculum at its meeting next June, in Seattle, Washington. Dr. Glenn A. Fry, Director of the School of Optometry at The Ohio State University, has been invited by the Association to make an intensive study and to report his findings and recommendations.

Many administrators report that the broad areas of instruction covered in the optometric curriculum are difficult to crowd into the present five-year program. The A. S. C. O. includes members of the faculties and administrations of all schools and colleges of optometry in the United States and Canada.

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CORRESPONDENCE

ADDITIONAL COMMENTS ON THE GUILD REPLY

To the Editor:

I have just read the October, 1953, issue of GUILDCRAFT, (Vol. 22, No. 10). This issue contains an article, *Is There a "Pattern?"* by Henry B. Carpenter, that was the official reply to the Koch report, *Problems With Dispensing Opticians*, which appeared in the June and August issues of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF AMERICAN ACADEMY OF OPTOMETRY. I have read the Guild article with interest and would like to comment on this reply to Koch.*

First it seems to me that the Guild is unable to discuss your report on the same tone or level as you presented your material. Perhaps I am prejudiced. A review of the reply makes me consider the attitude of Guild opticianry more or less comparable to that of some of our own men who cannot see the "big picture" sufficiently to see any "good" in the other group. It concerns me that groups with such viewpoints can get themselves on the National Interprofessional Committee on Eye Care.

One recurrent theme seems to arise in the reply—an appeal to ophthalmology to intercede and to protect opticianry. This is rather subtle, but it is done by, (1) flattery of ophthalmology, (2) the accusation that optometry is fighting opticianry in order to force ophthalmology out of the refracting field, (3) that the only and basic relationship between optometry and ophthalmology is a competitive one, (4) that optometry wants to dominate the field of eye care, and (5) that ophthalmology is the dominant body in the field of eye care and that it should take cognizance of the legal actions instituted against opticianry by local optometric groups.

In the reply the Guild contends that optometry has grown under the tolerance of the eye physician. This is either totally naive, or is another appeal for medical support in this discussion. I think such "baiting" could reopen some unpleasantness between medicine and optometry among the unthinking practitioners on both sides. This may be their purpose. I am sure you are aware of this possibility.

The Guild chooses to elaborate on individual opinions and local actions to indicate a lack of sincerity by national optometric organizations. One does not prove the other. It is true, however, that it is still

*For other comments see Editorial in this issue by Dr. Eugene Freeman.

the avowed purpose of the Guild to educate the public that optometric services are inferior to the "eye-physician-Guild-optician" service. This being so, is it possible to expect the Guild to serve a useful purpose in the philosophical functions of the National Interprofessional Committee on Eye Care until the Guild revises its purpose to assuring the public of the best obtainable eye care, no matter what the source?

Is the Guild aware that optometry is dominant in the amount of refractive eye care furnished the public? Is optometry's position so uneconomic? Does the Guild really feel that all optometrists derive most of their income from what are "really dispensing services" as they claim?

In my judgment the analysis by the Guild of the "permissive phases" of the various optometry laws relating to fitting and adapting of materials is a negative one. There was no prior legislative definition of opticianry, and if anything, the present function and position of opticianry is "permissive" on the part of the optometry boards. I suspect opticianry realizes this and desires its position defined by law. To clarify matters, perhaps it should be.

The Guild reply neatly evades the economic consideration that in the eye care field, the dispensing optician is most overpaid, for the responsibility assumed and the service rendered.

At present there is an excellent opportunity to draw all three groups together. Nothing brings divergent feelings into agreement as fast as something common-to-all to fight against. Why not have the Committee guide some of this strong feeling into a campaign to fight and eliminate the commercial "quickie" refractionist and his associates. If all three groups worked together on this problem it could be solved and in eliminating these activities which we all deplore a common respect for each other would be developed.

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CURRENT COMMENTS

Terry Judith Parkins
Editorial Assistant

Optometrists will confer a favor by sending news items of general interest for this department: such as relate to new instruments, clinical techniques, education, visual health and optometric legislation and organization.

LARGER DEDUCTIONS FOR HEALTH EXPENDITURES PROPOSED

When congress reconvenes in January of next year, a number of measures will be introduced which will be of interest to optometry. One of these relates to a major tax law revision. This change proposes to give all individual taxpayers a larger deduction for medical aid and health expenses. This will be very pleasing to all families served by optometrists.

Under the present income tax law medical expenses, including examinations, refractions and lenses and frames as prescribed by optometrists, are deductible on the individual income tax returns only if the total expenditure for health purposes exceeds five per cent of the gross income of the individual taxpayer and his family. Thus, at present, a taxpayer making a gross income of $6,000 a year would be able to use as a deduction only those medical and health expenditures of his family above $300 during the year.

Under the proposed change, now being studied by the tax writing ways and means committee of the House, this five per cent figure may be reduced to three per cent. This would mean that the taxpayer making a gross income of $6,000 a year would be able to deduct medical and health costs above $180. This would be a welcome and significant spur to the practices of optometrists. The new reduced figure of three per cent of the gross income would be reached and exceeded by many family groups through only routine medical, optometric and dental care. These families, with the present higher figure of five per cent, rarely gave this item much consideration unless major illness was present. If the change is adopted, patients in sheer self-interest will now feel compelled to keep track of these expenditures and to use the total to reduce the net upon which taxes are paid.

For many families it will mean that the cost of optometric care will be reduced by an appreciable amount after the three per cent initial expenditure has been reached. If this measure, as proposed by Rep. Reed (R., N. Y.) passes, it should have a stimulating effect upon the volume of work done by optometrists. This is a measure which should have the full support of optometrists and their patients.

MORGAN HONORED AT BERKELEY

The third annual reunion of the University of California School of Optometry was held on the Berkeley campus on October 24, 25 and 26 with 163 optometrists in attendance. The well-attended educational sessions were addressed by Edward P. Drescher, M.D., Gordon L. Walls, Sc.D., Guy T. Buswell, Ph.D., LL.D., Meredith W. Morgan, Jr., Ph.D., and Elwin Marg, Ph.D. In addition, seminars on contact lens fitting, squint orthoptics, non-squint orthoptics, color vision testing, and aniseikonia were presented during the reunion.

The high point of the reunion was reached when, at the banquet, the Alumni Association Citation was presented to Dr. Meredith W. Morgan, Jr., honoring him for his many contributions to the profession of optometry, including professorship of Physiological Optics and Optometry at the U. C. School of Optometry, and presidency of the American Academy of Optometry. Dr. Morgan was obviously surprised and deeply moved when the well-kept secret was announced.

Ovations were also given to the two other honored guests Dean Emeritus Ralph S. Minor and retiring Professor Frederick L. Mason.

ON THE PRIVILEGE OF TAKING STATE BOARDS

The following significant resolution has been approved by the Association of Schools and Colleges of Optometry. As this group includes all of the accredited schools and colleges serving the profession the action should result in a prompt and responsive study of the matter on the part of State optometric groups.

WHEREAS, certain state boards of examiners in optometry have denied graduates of certain schools and colleges of optometry the privilege of taking state board examinations; and

WHEREAS, the Council on Education and Professional Guidance of the American Optometric Association is the accepted school accrediting agency of the profession; and

WHEREAS, the Council on Education and Professional Guidance had diligently performed its duties of inspecting and evaluating our optometric educational institutions; now, therefore, be it

RESOLVED, that the Association of Schools and Colleges of Optometry strongly urges that all state boards of examiners in optometry accept for examination graduates of all schools and colleges of optometry accredited by the Council on Education and Professional Guidance of the A.O.A.; and, be it further

RESOLVED, that state boards of examiners of optometry in those states where this is legally prohibited at this time strive to bring about proper means of removing these legal restrictions.

WAHL LEADS FIGHT

At the recent meeting of the Heart of America Optometric Congress in Kansas City, Missouri, November 9, Dr. James F. Wahl, president of the American Optometric Association lashed out at those "quickie" refractionists working for business minded retail optical

firms, and also at those optometrists who were employed by various "plans" to furnish cut-rate eye care on a production line basis.

Wahl finds that these activities are harmful to both the public who consequently suffer from poorly done refractions and to the ethical optometrist who is placed at a disadvantage because he cannot and will not compete with slip-shod refractive work nor compete through the use of inferior frames and lenses.

Wahl calls for action. Action based on better education—the elimination of substandard materials and the curtailment of commercial eye practices.

This aggressive stand by President Wahl is all to the good. Optometry should be rallied against these procedures and the A.O.A. is the organization which should do it. The A.O.A. should lead the fight. Every known technique must be used upon those characters who are blinking the public in the good name of optometry.

Now that President Wahl has lead the way—lets have more of the same by the entire official family of the A.O.A. and let them do the job of getting all of our State associations working on this program. Most local optometric leaders are itching to get into this fight. All they need is the advice and guidance of the A.O.A. Chart the road and they will carry the ball at the State level. This problem can be whipped. We owe it to the public to cast aside this slovenly type of eye care.

CAMPUS NEWS

The Massachusetts College of Optometry, 178 Newbury St., Boston, announces the formation of a Speakers Bureau. Optometric organizations are invited to write for a prepared list of speakers, topics and dates. The bureau is under the supervision of Dr. A. F. March, Jr.

Dr. Joseph R. Smith of Detroit has been appointed as instructor in clinical optometry at Chicago College of Optometry. Dr. Smith is a graduate of the Detroit Institute of Technology and Chicago College of Optometry.

Glenn Wooters, Director of Research, Titmus Optical Company, Petersburg, Virginia, was a guest lecturer in the schools classes in ophthalmic mechanics at the Southern College of Optometry, Memphis, during October.

Dr. Carl F. Shepard and Dr. Maurice D. Pearlman of the faculty of Northern Illinois College of Optometry were speakers at the educational workshop of the Wisconsin Optometric Association September 26-27.

Dr. Charles Margach and Dr. Harold Haynes of the faculty of the College of Optometry, Pacific University, were on a panel dealing with extra educational services for children at the Western Regional meeting of the International Council for Exceptional Children, November 1, at Portland, Oregon.

The Los Angeles College of Optometry announces the appointment of Stuart H. Fisher, Ph.D., of London, England, to its faculty. Dr. Fisher will conduct a lecture course and laboratory course in geometric optics at the college.

NEW JERSEY BOARD OF OPTOMETRISTS—RULE 27

"No optometrist shall cause or permit the use of his name, profession and/or professional title by or in conjunction with any firm, company, corporation or non-licensed person, in any advertising of any manner."

This new rule has been adopted by the New Jersey State Board of Optometrists and has been filed with the Secretary of State in accordance with the requirements of the Optometry Act. According to Dr. E. C. Nurock, Secretary-Treasurer of the Board, the new rule becomes effective January 1, 1954. This rule should assist in curbing the activities of those remaining few optometrists who still associate themselves with lay persons and corporations.

AMERICAN OPTICAL COMPANY—LEGAL CHART

An ingenuous chart has been prepared by the Professional Relations Division of the American Optical Company under the direction of Dr. W. J. Heather. This chart lists all States and Provinces and then indicates the legislative and legal status of optometry in each State or Province by 15 special classifications.

These are, a "profession" by court action: a "profession" by statute: "corporate practice" prohibited: "ready-made spectacles" prohibited: not declared a "profession" by legislature: not a "profession" by court decision: the implications of sales tax and the restrictions on advertising. These latter are divided into the prohibition of, knowingly false: false: misleading: improbable: likely to be false: free service or examination: fees and terms.

The reference material is then classified on the chart providing quick and easy study. An immense amount of research must have gone into the preparation of this chart which will have many useful purposes.

NEWS BRIEFS

Dr. Eugene W. Strawn, Freeport, Illinois, has been appointed Technical Consultant on Military Optometry for the A.O.A. by Dr. James F. Wahl, president. Dr. Strawn served as Lt. Colonel in the U. S. Army during World War II. . . . The third annual public relations roundtable of the A.O.A. will be held at the Sheraton Hotel, St. Louis, Missouri, January 10-11, 1954. The registration fee will be $15. . . . Dr. Joseph I. Pascal was guest of honor at the Golden Jubilee dinner of the New Jersey Optometric Association on October 17. Dr. Pascal was awarded a citation for distinguished service to optometry. . . . Dr. Oscar L. McCulloch, Holyoke, Massachusetts, has been appointed to the Board of Registration in Optometry of the Commonwealth of Massachusetts by Governor C. A. Herter. Dr. McCulloch takes the place of Dr. Walter I. Brown who retired because of illness. . . . The South Plains and Panhandle Societies of the Texas Optometric Association held a joint seminar at Lubbock, October 23-25. The next seminar will be held at Amarillo in 1954. . . . Dr. Franklin Stump of the Bausch & Lomb Optical Company, Rochester, New York, will be one of the speakers at the coming meeting of the American Association for the Advancement of Science at Boston, December 29. His topic will be "Visual Testing Procedures in Industry." . . . The Committee on Occupational Vision of the A.O.A., Dr. E. H. Westland, chairman, will soon publish a handbook on Industrial Vision. Copies may be obtained upon request from the St. Louis office of the A.O.A. . . . The World Health Organization, Washington, D. C., has just published a new World Directory of Medical Schools. More than 500 are listed in 84 countries. There are 79 in the U. S. A. Russia has 61. England 27. The oldest school listed is the College of Medicine of Coimbra, Portugal, which was established in 1290. . . . Dr. A. M. Skeffington was one of the speakers at a seminar on vision at the Massachusetts Institute of Technology, September 23. . . . Dr. Herbert S. McClung, 79, of Regina, Saskatchewan, died September 30. Dr. McClung was one of the first Canadian members of the American Academy of Optometry. . . . The Association of Schools and Colleges of Optometry have appointed a committee to study Selective Service regulations as these relate to student deferment. The committee will keep all schools and colleges aware of changes and new developments. Dr. Morton Abram, Chicago College of Optometry, is chairman of the committee.

PROPOSED CURRICULUM AT OHIO STATE

Dr. Glenn A. Fry, director of the School of Optometry, The Ohio State University, announced that it is planned that the optometry curriculum will be changed to a six-year course effective in October, 1954. This course will consist of two years of undergraduate academic work followed by four years of undergraduate professional training. A Doctor of Optometry degree will be awarded at the completion of the sixth year.

COLUMBIA ALUMNI BICENTENNIAL CELEBRATION

According to Robert E. Bannon, the Columbia University Optometry Alumni Association has ambitious plans for an occasion on which the 200th anniversary of Columbia University may be celebrated.

Alumni of the many departments, school, and colleges comprising Columbia's vast family will commemorate, in 1954, the University's Bicentennial. It is only fitting that Optometry Alumni, one of the University's youngest children, inaugurate the year 1954 with suitable ceremonies in honor of their Alma Mater.

Dr. Melvin Schrier, President of The Columbia Optometry Alumni and Chairman of the Arrangements Committee, and Dr. Bernard Meyer, Director of Public Relations, have completed arrangements for a formal banquet and dance to be held at the St. Regis Hotel Roof and Penthouse, 55th Street and 5th Avenue, New York City, on Saturday, February 20, 1954. Reservations, at twenty-five dollars per couple, should be made through Dr. Burton Kleinman, 1543 West First Street, Brooklyn, New York.

This important occasion, which will be attended by the University's principal administrative officers, should provide an auspicious indication of the Alumni's interest in the current endeavor to establish at Columbia a professional doctorate degree in Optometry following a newly proposed curriculum.

Professor Frederic A. Woll, beloved teacher and friend of everyone fortunate to have studied under him, will be honored at this significant event, which should prove to be a propitious observance by grateful and devoted Columbia Optometry Alumni.

Although reservations will be limited, it is expected that a great many Columbia Optometry Alumni will be proud and eager for this opportunity to help celebrate Columbia's 200th birthday and to honor Professor Woll.

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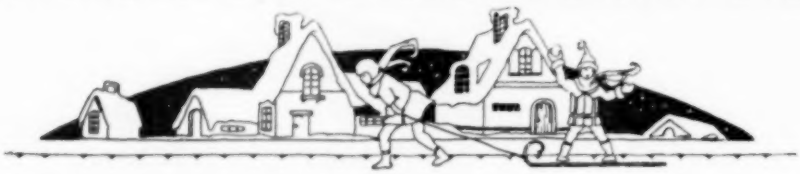

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